

# Provenance of Late Paleozoic-Mesozoic sandstones, Taimyr Peninsula, Arctic

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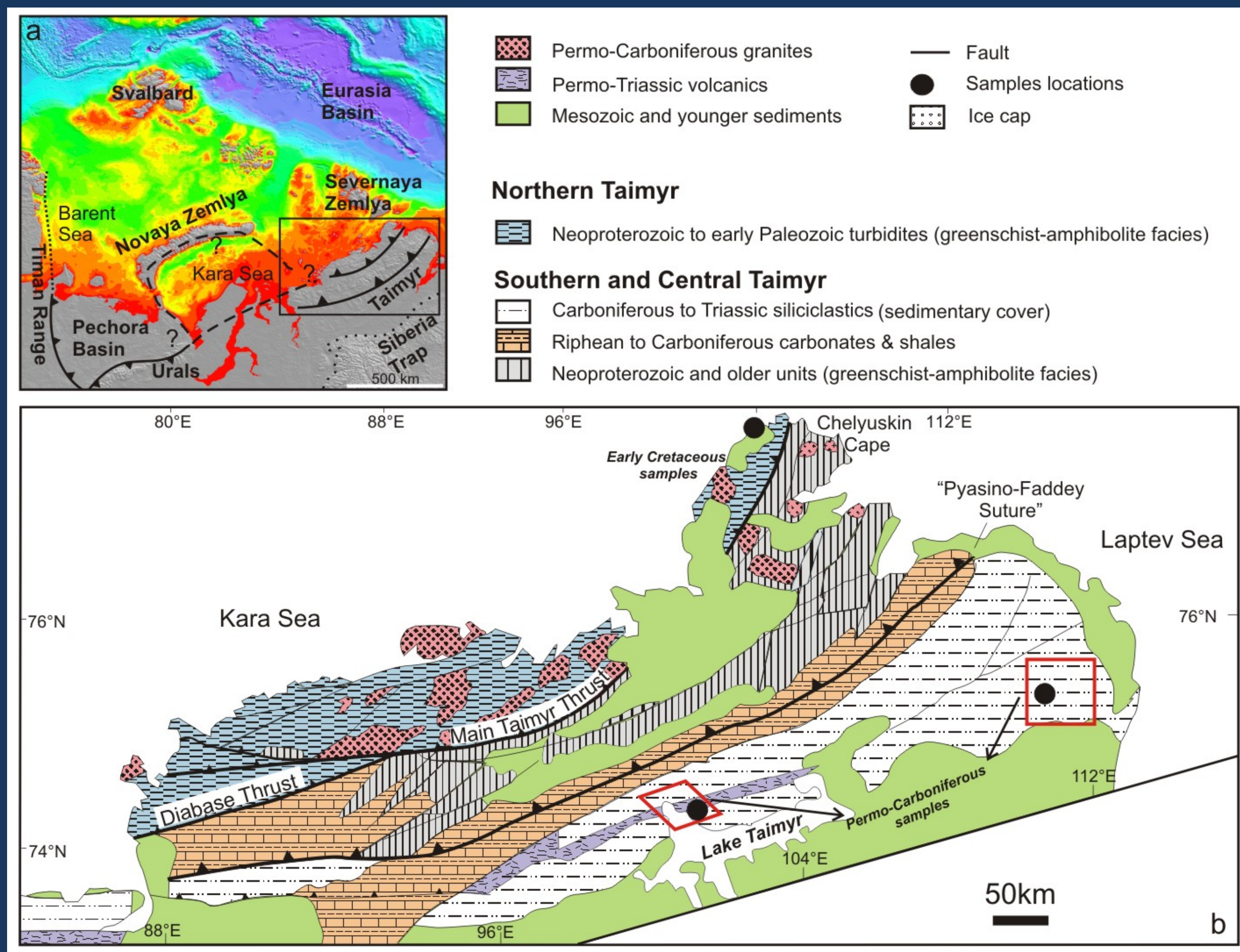


Fig. 1 (a) Regional setting of the Taimyr Peninsula. Bathymetry is from the IBCAO Arctic Bathymetry Database. Note the possible scenarios for the northward continuation of the Urals. (b) Simplified geological map of the Taimyr Peninsula. Circles indicate sample localities.

The Taimyr Peninsula, lying on the edge of Eurasia shelf, is a key element in the circum-Arctic region. The Taimyr Peninsula preserves late Paleozoic through Mesozoic clastic sedimentary successions within its Mesozoic fold belt, providing an ideal location to investigate the late Paleozoic to Mesozoic tectonic evolution within a circum-Arctic framework.

The northward continuation of the late Paleozoic Uralian orogen in the Arctic region is debated and is relevant to Taimyr. Did the Urals

- (a) terminate at the Polar Urals? or
- (b) bend to Novaya Zemly then back to Taimyr? or
- (c) go to Taimyr directly?

The deposition age of the Permo - Carboniferous clastics in southern Taimyr is consistent with the last stage of Uralian orogeny. Thus, provenance investigation of this succession can provide information for understanding extent of the Uralian orogen in Arctic.

Early Cretaceous sedimentation is coeval with the opening of the Amerasia Basin, and thus provenance studies of early Cretaceous samples may provide information about the geological setting of Taimyr during the development of the Amerasia Basin.

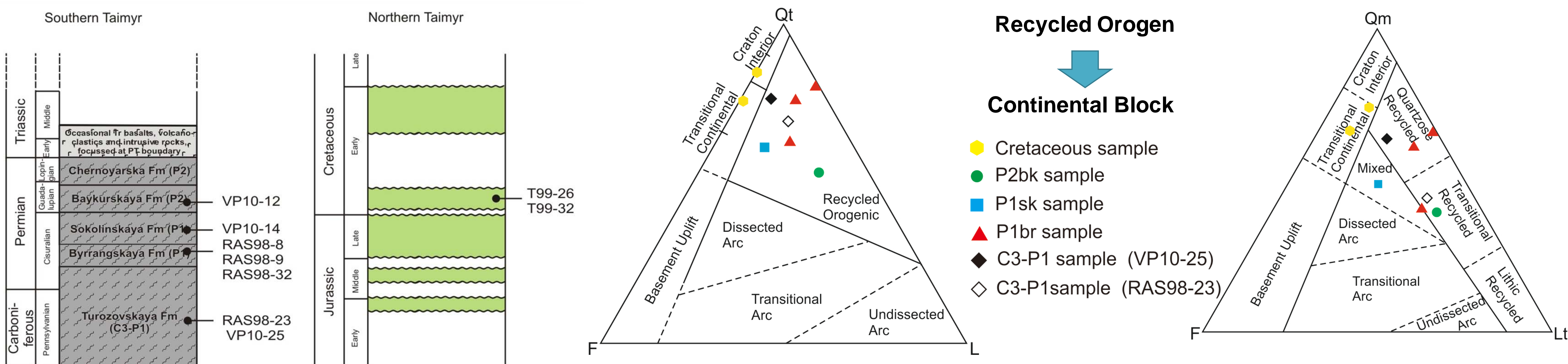


Fig. 2 Paleozoic to Mesozoic samples stratigraphic column (left); QtFL and QmFLt provenance discrimination diagrams (middle and right), showing evolution of provenance tectonic setting. All Late Paleozoic samples are within recycled orogenic region, while the Cretaceous samples are plotted in continental block source.

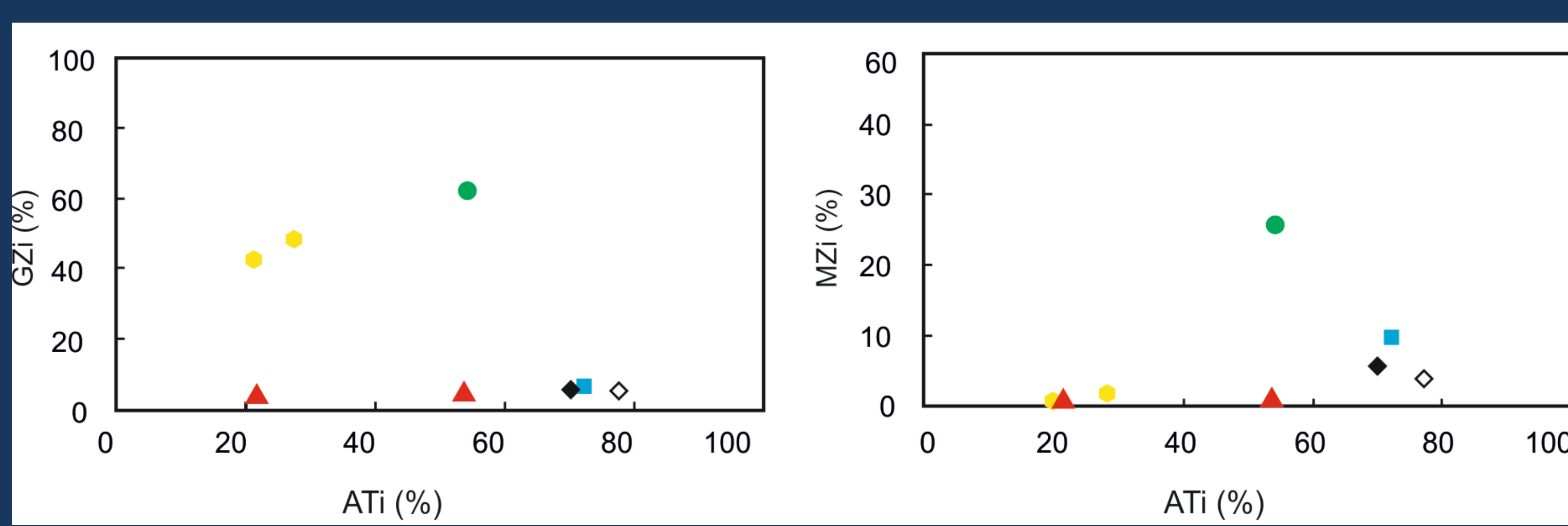
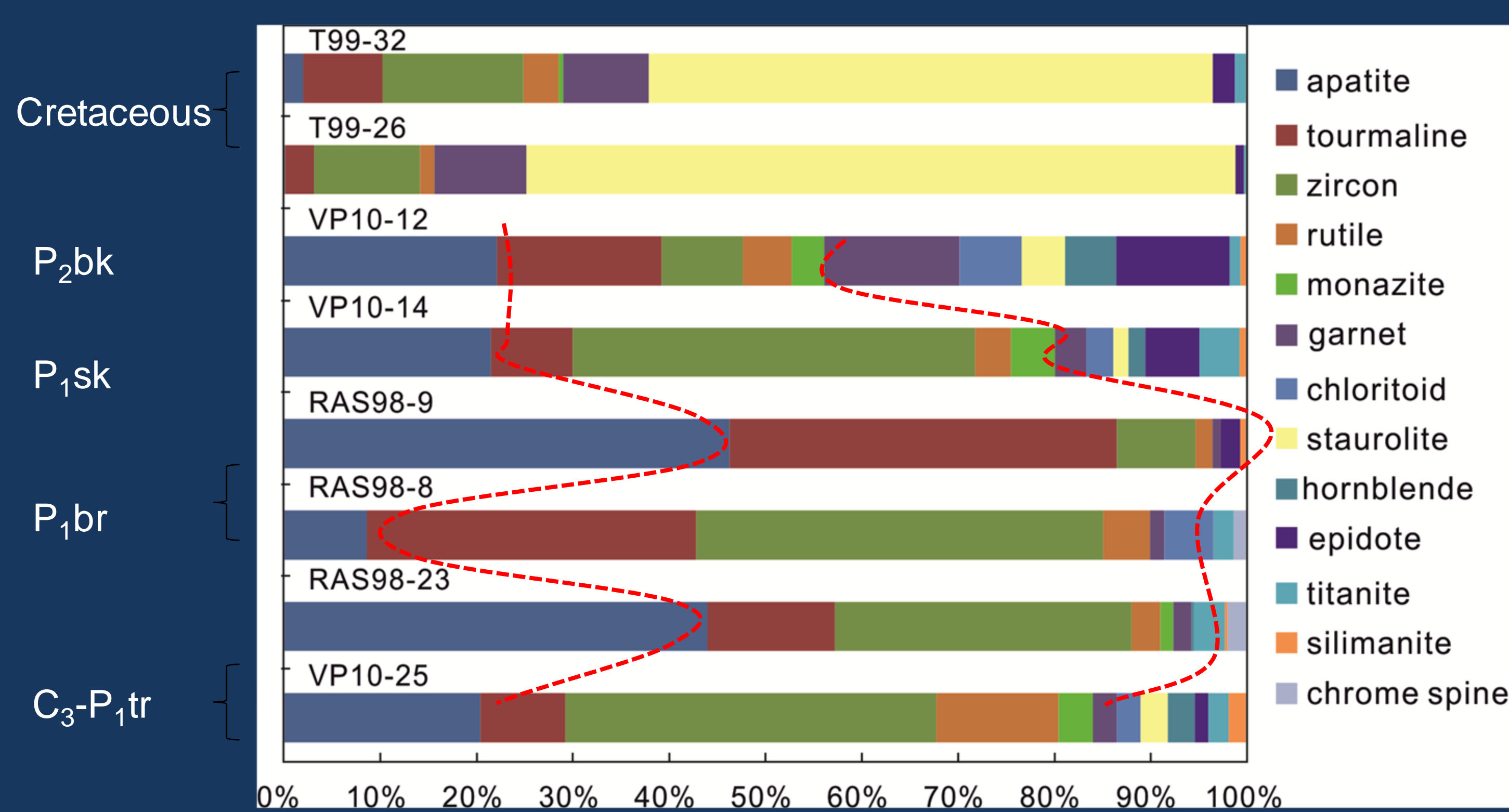


Fig. 3 Diagrams of heavy mineral assemblages, showing the relative abundance of heavy mineral species (right) and heavy mineral ratios (left).

The heavy mineral assemblages and ratios of the late Permian Baykurskaya formation present distinct differences: decreased ZTR, increased garnet and higher GZi and MZi ratios. Cretaceous samples are dominated by staurolite and have high GZi ratios.

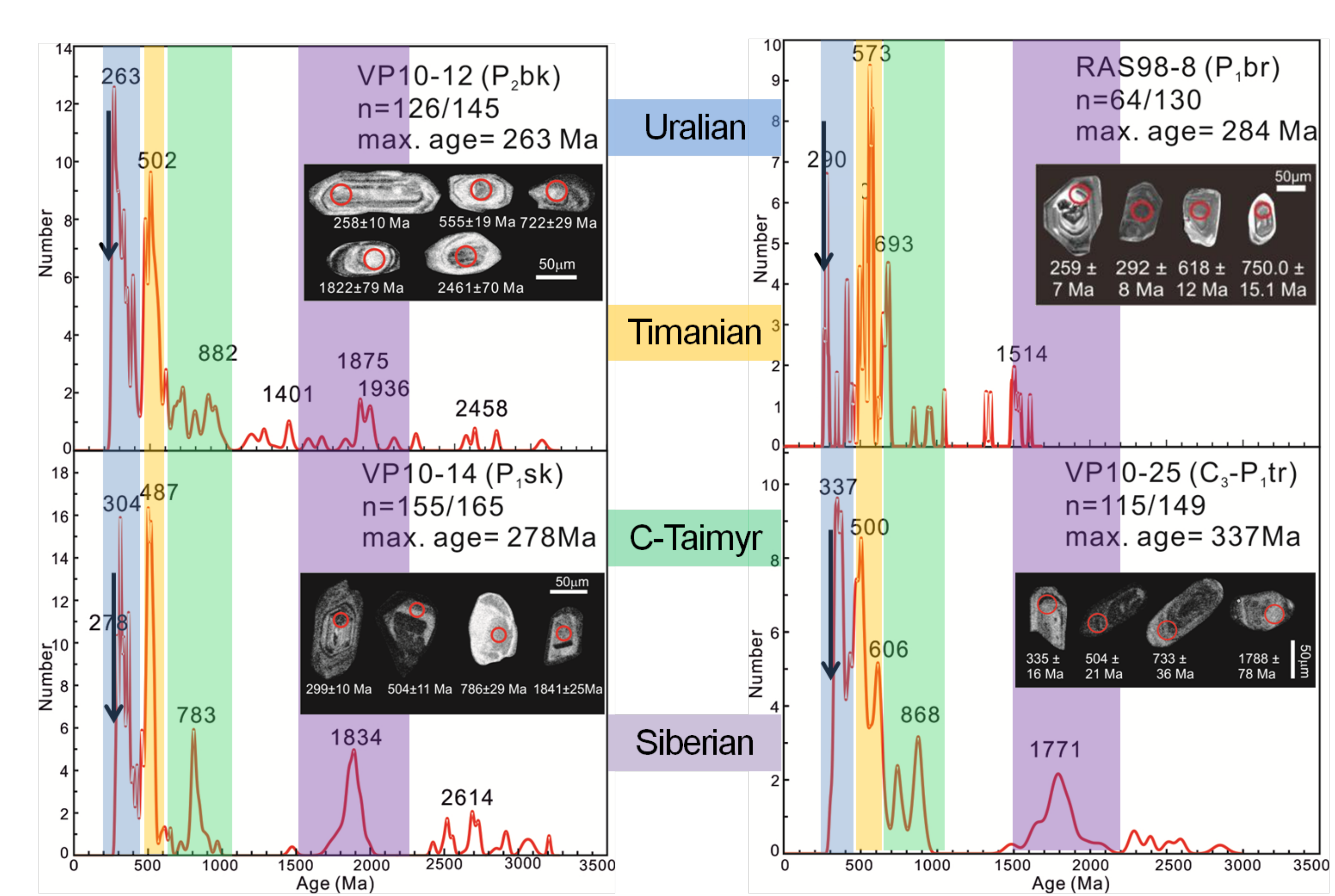


Fig. 4 Relative age probability diagrams of U-Pb detrital zircons zircon ages of Late Paleozoic sandstones from Taimyr.

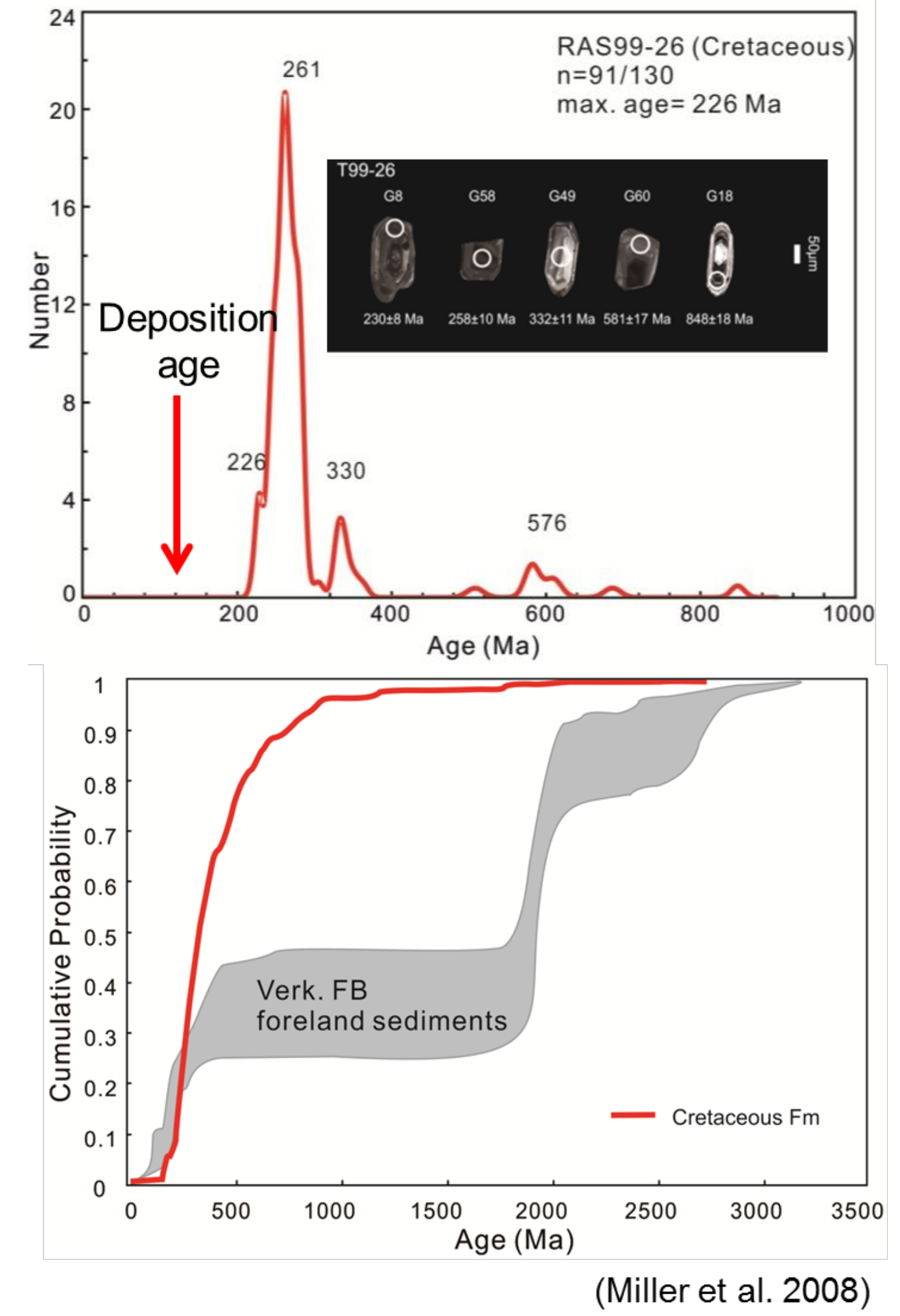


Fig. 5 Relative age probability diagrams of U-Pb detrital zircons zircon ages of Cretaceous sandstone (up); and cumulative probability plots of Cretaceous zircon age data from Taimyr compared with Jurassic-Cretaceous detrital zircon ages from Verkhoyansk Foldbelt.

### Conclusions:

1. The Uralian orogeny reached Taimyr Peninsula during late Carboniferous to late Permian time. The final collision between Baltica and Siberia in the last stage of Uralian orogenesis probably occurred at Late Permian.
2. Early Cretaceous sediment deposition is unrelated to the Verkhoyansk Foldbelt and instead reflects a rifting or post-rifting passive margin setting.



More information is in Zhang *et al.* 2013 Geosciences. This study is part of a large program to correlate circum Arctic geology (<http://www.cale.geo.su.se/>).